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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/605,745	10/23/2003	Wen-Kuo Lin	SISP0006USA	2744

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NORTH AMERICA INTERNATIONAL PATENT OFFICE (NAIPC)
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EXAMINER	
WOODS, ERIC V	

ART UNIT	PAPER NUMBER
2672	

DATE MAILED: 06/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/605,745	LIN, WEN-KUO	
	Examiner	Art Unit	
	Eric V. Woods	2672	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 May 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10 and 12-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10 and 12-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. 6/05.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments -- see Remarks pages 1-2 -- filed 9 May 2005, with respect to the objections to the specification and claims 1, 2, and 10 have been fully considered and are persuasive because of applicant's amendments. The objections to claims 1, 2, and 10 and the specification have been withdrawn.

2. Applicant's arguments – see Remarks pages 1-2 – filed 9 May 2005 with respect to the rejections of claims 2 and 11 under 35 U.S.C. 112, second paragraph, stand rejected in view of applicant's amendment of claim 2 and cancellation of claim 11.

3. Applicant's arguments – see pages 2-6 – filed 9 May 2005, with respect to the rejection(s) of claim(s) 1-16 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejections have been withdrawn. However, upon further consideration, a new ground(s) of rejection is made as set forth below. Applicant's amendments changed claim scope sufficiently and narrowed it, which necessitated withdrawal of the rejections.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nacman in view of Chia et al (US PGPub 2003/0174148).

As to claim 1,

A method for scaling a digital picture to generate a scaled picture comprising following steps:

(a) Scaling a portion of the digital picture instead of the whole digital picture in a first direction; (Nacman [0006, 0013, 0014] clearly teaches the scaling of a digital image in one direction at a time; Chia clearly teaches in Figs. 2(a)-2(h) and 3 the division of an image into pieces or portions, see for example claim 18 – where an image is divided into various pieces, see [0027] as an example.)

(b) Scaling part of the data produced in step (a) in a second direction; and (Nacman [0006, 0013, and 0014] clearly establishes that scaling can be done one dimension at a time)

(c) For each different portion in sequence, repeating steps (a) and (b) to form the scaled picture. (Chia clearly teaches sequential processing of portions of an image, where in claim 18, the process is exactly the same, wherein the pieces are sequentially scaled.)

Reference Nacman clearly teaches scaling an image in multiple directions, but performing the scaling in only one direction at a time as recited by applicant, but does not expressly teach processing only a portion of the digital image. Reference Chia clearly teaches partitioning an image into multiple pieces and processing each piece.

The two references are clearly directed to the same problem solving area, e.g. the processing of images.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the image processing of Nacman with the image partitioning of Chia, as it is well known in the art that processing an image sequentially (e.g. splitting it into pieces and then processing each piece) requires less memory than processing an image at once, (for example, the frame buffer could be much smaller if a compression ratio of five were employed, conceivably five time smaller, all other factors being held equal – see [0002-0004] of Chia) thusly applying the technique to the image processing of Nacman would result in a cheaper device requiring less memory. It would also be *prima facie* obvious to anyone of ordinary skill in the art that using less memory would be better and thus, if possible, to process an image in that manner with the simpler, cheaper apparatus.

As to claim 8,

The method of claim 1 wherein step (b) is performed by using all of the data produced in step (a).

This is an obvious variation of claim 1. It would be obvious to one of ordinary skill in the art to continue processing the portion of an image produced in step (a) and

then to process the entirety of that portion in step (b) because the desired end result is a correctly scaled image portion. Further, as mentioned in Nacman [0014-0017], the scaling is performed in one direction and then in another. It would be obvious to continue processing the whole data portion sequentially. Also, the system of Chia processes data portions by sending them to multiple processors. Such scaling would occur one direction at a time per portion, but given that portions would be processed, it would logical to keep the entire data portion in one block for processing, as it is simply easier and more logical. Any other variant would be difficult to implement practically.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the image processing of Nacman with the image partitioning of Chia, as it is well known in the art that processing an image in parallel (e.g. splitting it into pieces and then processing each piece) is much faster than processing an image at once, (for example, the processing time for an image split into 4 pieces and processed in parallel is cut by three-quarters versus the time required to process the original image, all other factors being held equal) thusly applying the technique to the image processing of Nacman would result in faster image scaling. It would also be *prima facie* obvious to anyone of ordinary skill in the art that parallel processing would be faster and thus, if possible, to process an image in that manner.

7. Claims 2-4 are rejected under 35 U.S.C. 103(a) as unpatentable over Nacman in view of Chia as applied to claim 1 above, and further in view of Van Asma et al (US 6,600,514 B1)('Asma').

8. As to claim 2,

The method of claim 1 where steps (a) and (c) are performed by using an N-tap filter where N is a natural number.

References Nacman and Chia are silent about the nature of the digital processing. However, it is a fundamental of the digital image processing art that the scaling of an image clearly requires filtering of some kind, be it as crude as dropping rows of pixels for reduction of an image or simply interpolating them for enlargement, and fundamentally digital image processing is performed using convolution and filtering operation (see any textbook on the subject).

Reference Asma clearly teaches the use of an N-tap digital filter to filter images, and further teaches in 1:25-60 the use of such filters for processing images one dimension at a time, and further that such filter is composed of any N>2, which clearly fulfills the requirement that N be a natural number, and N=4 would be a natural number as recited by applicant in the above claim.

The references are clearly analogous art, as both are directed to digital image processing (e.g. Nacman and Asma).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the N-tap filter of Asma with the image processing of Nacman and Chia because the filters of Asma are clearly taught to be good for processing images one dimension at a time (1:25-60).

9. As to claim 3,

The method of claim 1 wherein the first direction is a horizontal direction, and the second direction is a vertical direction.

Reference Nacman clearly teaches processing images one direction at a time, with multiple directions (Nacman [0013), but never specifies horizontal and vertical directions. Reference Asma clearly teaches in 1:40-50 the use of one filter to process the image in a horizontal direction and then in a vertical direction. Clearly, the cited one-dimensional filters of Asma would filter each direction specified in Nacman under that implementation. As mentioned in the rejection to claim 2, the above references are analogous art.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the N-tap filter of Asma with the image processing of Nacman and Chia because the filters of Asma are clearly taught to be good for processing images one dimension at a time (1:25-60).

10. As to claim 4,

The method of claim 1 wherein the first direction is a vertical direction, and the second direction is a horizontal direction.

See the rejection to claim 3. This claim merely reverses the order of the directions being processed and is an obvious variation, as this type of image processing system can process images in either order and still get the same result.

11. Claims 5-7 are rejected under 35 U.S.C. 103(a) as unpatentable over Nacman in view of Chia as applied to claim 1 above, and further in view of Nielsen (US 6,591,011 B1)('Nielsen').

12. As to claim 5,

The method of claim 1 further comprising step (d): initializing a buffer used for storing the data produced by step (a).

Reference Nacman clearly teaches the use of buffers for holding data processed during the scaling of data in one direction ([0012-0014]). Clearly, such buffers have to be initialized. Reference Nielsen clearly teaches the use of buffers to hold transient data during processing (5:17-38, where clearly both buffers and "work areas" in memory for putting data during processing exist). Clearly, the larger and more numerous buffer areas of Nielsen would allow for a designated memory area and buffers to hold the results immediately after the scaling performed in step (a).

As far as the initializing step – Nielsen teaches that his system has an initializing step (9:25-30). Also, Nielsen shows a value being initialized in 30:35-45. Clearly, all buffers are initialized during an initialization step, and would *prima facie* be initialized each time a new data set was written in (e.g. for temporary storage after performing the step (a) recited by applicant). Nielsen performs zooming in 6:1-10 in feature extraction units 11 and 12 in Fig. 1.

Further, reference Nielsen can divide the image into multiple parts for processing (8:18-32), which would clearly allow for each portion to be processed by the parallel processing capabilities of Chia.

The references are analogous art – they are both from class 382. Further, they both relate to image processing (5:10-67 as evidence for example in the case of Nielsen) and both perform digital image scaling / zooming. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the

image processing systems of Nacman and Chia with the image processing and buffers of Nielsen to enhance the number of buffers and memory work areas available to the processors of Nacman and Chia, and to allow specific memory areas for storing the recited image portions.

13. As to claim 6,

The method of claim 5 wherein step (d) comprises applying a mirror boundary condition to the buffer.

References Nacman and Chia do not explicitly teach this limitation. Reference Nielsen clearly teaches this limitation – e.g. the mirroring of a digital image (Figs. 16, 17A-17B; 3:54-65; 12:23-44, 12:52-67, 13:1-45). Given that this act of mirroring takes place after the initialization step, clearly the system of Nielsen performs the recited step. Further, Nielsen teaches obviously mirroring the data. Given that the data would be stored in the buffer, it would be obvious that the mirroring operation would be applied to that buffer as taught by Nielsen, and it would simply be obvious to one of ordinary skill in the art – and well known – that if an image is in a buffer and mirroring operation were performed, it would be performed on the data in the buffer so as not to effect the data on the screen of the device. Please see rejection for claim 5 above for analogous art justifications and similar.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the image processing systems of Nacman and Chia with the image processing and mirroring of Nielsen to allow transposition and rotation of images for further processing, as Nielsen teaches (see Figs. 16 and 17A-17B).

14. As to claim 7,

The method of claim 1 further comprising before scaling a last portion of the digital picture in the second direction, applying a mirror boundary condition to part of the digital picture scaled in step (a).

References Nacman and Chia do not explicitly teach this limitation. Reference Nielsen clearly teaches this limitation – e.g. the mirroring of a digital image (Figs. 16, 17A-17B; 3:54-65; 12:23-44, 12:52-67, 13:1-45). Clearly the system of Nielsen performs the recited step. Please see rejections for claims 5 and 6 above for analogous art justifications and similar, which rejections are herein incorporated by reference.

Further, it would have been obvious to modify the apparatus of Nacman to perform the recited mirroring step in Nielsen so that it could process the image portions recited in Nielsen and Chia (see rejection to claim 5 for the explication of the Nielsen reference providing splitting images into portions for processing). Also, image mirroring is extremely well known in the art and it is a fundamental technique of image processing along with translation and rotation.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the image processing systems of Nacman and Chia with the image processing and mirroring of Nielsen to allow transposition and rotation of images for further processing, as Nielsen teaches (see Figs. 16 and 17A-17B) and since both systems perform digital zoom functionality (Nielsen performs zooming in 6:1-10 in feature extraction units 11 and 12 in Fig. 1).

15. Claim 9 is rejected under 35 U.S.C. 103(a) as unpatentable over Nacman in view of Chia as applied to claim 1 above, and further in view of Iga (US PGPub 2004/0021790 A1)('Iga').

16. As to claim 9,

The method of claim 1 further comprising omitting part of the digital picture before performing steps (a) and (b) where a scaling factor is 2^k wherein k is a natural number.

References Nacman and Chia do not explicitly teach the removal of part of the digital picture before scaling. Reference Nacman does not ever explicitly state what the scaling factor used is. Reference Iga clearly teaches the uses of noise removal means. The noise removal technique takes an original image 4A and removes the artifacts created by noise and produces the cleaner image 4B with the artifact 414 removed. Clearly, such a noise removal method would be useful for processing an image before scaling it in order to avoid introducing noise or artifacts into the scaled images.

As for the scaling factor limitation, clearly the values could be any reasonable number. For example, standard zoom factors available on imaging programs and cameras are 200% or a factor of 2, which is 2^1 and clearly meets the recited limitation of 2^k, since 1 is a natural number. [For examples of this, see for example Ishikawa et al (US 6,339,424 B1) – 7:35-50, et cetera.]

Further, the scaling factor is not specified to be the scaling factor used in steps (a) and (b); as this scale factor is introduced as 'a scale factor'.

Clearly, reference Iga is directed to the same problem solving area (e.g. image processing), as are Nacman and Chia. Further, the elimination of noise is well known in

the art as desirable, particularly in the pre-processing stages of image preparation. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the systems of Nacman and Chia with the image processing and noise reduction techniques of Ida to remove artifacts from the image before it was broken into portions and processed.

Applicant's amendment changed the term removing to omitting, which is still the same thing. The definitions of the two terms are very close, and it would be obvious that noise could simply be omitted before the data process was omitted, e.g. pixels and/or subpixels could selectively not be transmitted or dropped from the data stream, which would be the same thing as removal, and such a change would be trivially obvious to one of ordinary skill in the art.

Allowable Subject Matter

17. Claims 10 and 12-16 are allowed.

The following is an examiner's statement of reasons for allowance: claims 10 and 12-16 are allowable.

18. Claim 10 is allowable because sequentially scaling portions of an image in the manner set forth in the claims using the aforementioned L-tap filter with the number of taps being the same in both directions using two buffers with the data having the specified size is not found in the prior art. N- and L-tap filters are known in the art, but generally such filters have different dimensions for different directions and the file size is variable. Although certain embodiments (e.g. Asma) are known that process images using N-tap filters and it would have been obvious to process images by tiles, using

data that has different sizes (e.g. non-square tile-like region) yet applying the same L-tap filter in both directions is a fairly unique concept. Also, as applicant pointed out, generally such scaling processes are done in parallel rather than serial mode to decrease processing time. Therefore, all the recited features in combination render the claimed invention novel and non-obvious.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric V. Woods whose telephone number is 571-272-7775. The examiner can normally be reached on M-F 7:30-4:30 alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi can be reached on 571-272-7664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Eric Woods

JEFFERY BRIER
PRIMARY EXAMINER

June 16, 2005